If the fade-out range is not limited by two neighboring subcarriers, all the subcarriers within the fade-out range must additionally be zeroed. Such a case is represented in Fig. 10a. The subcarriers labeled with „*“ have to be zeroed.

If the fade-out range does not exactly end at one subcarrier but between two subcarriers, the outermost must also be zeroed, as can be visualized in Fig. 10b. If need be, the next adjacent subchannels must be charged with zero too.

If the fade-out range comprises several subcarriers, it is not sufficient to transmit only one compensation pulse since the interfering maximum of the side lobes arises between two adjacent subcarriers respectively. Therefor, five compensation pulses must be generated in Fig. 10a and six in Fig. 10b.

As a result thereof and according to the invention, a pulse for compensating the side lobes occurring in the fade-out range is additionally transmitted for each frequency range extending between the subcarriers contained in the fade-out range and the thereto adjacent subcarriers with zero charge respectively, said pulse being provided with a frequency spectrum that resembles the side lobes occurring in the intermediate ranges and being modulated according to the data values of the side lobes occurring in the respective intermediate ranges, the compensation pulse(s) being transmitted orthogonal to the information transmitting subcarriers.

The amplitude and phase of the side lobe spectra for the fade-out range is calculated from the data values of a number of subchannels that can be predetermined and the compensation pulse pertaining to each frequency intermediate range is obtained by summation of the discrete complex side lobe spectra that are calculated for this purpose. Prior to transmission, the thus obtained compensation pulse(s) are superimposed on the transmitter signal in such a manner that the fade-out range is freed from interfering side lobes.

A particularly high number of usable subcarriers may be achieved in that, except for the subcarriers contained in the fade-out range, only the subcarriers that are located at the border of the fade-out range or outside the border in proximity thereto be charged with zero. By charge,

the modulation of a subcarrier is meant.

In Figs. 11 and 12 variants of transmitting parts of a transmission system according to the invention are indicated in the form of a basic block diagram by means of which the method according to the invention may be carried out.

In Fig. 11, the transmission unit comprises an Inverse Discrete Fourier Transform unit (IDFT) 1, by means of which a plurality of subchannels that subdivide the transmitting frequency range with allocated subcarriers may be modulated. The receiver unit not here presented contains a corresponding Discrete Fourier Transform unit (DFT) by means of which the transmitted data may be demodulated.

Through the IDFT-unit 1, all the subcarriers contained in the fade-out range and the subcarriers adjacent the fade-out range may be charged with zero, so that no major lobes from subcarriers can occur in the desired fade-out range.

The data to be transmitted are redirected as a vector x(n) through the input unit 7 to the IDFT-unit 1 and to a processing unit 4. Said processing unit serves to compute side lobes occasioned by subchannels located outside the fade-out range. From these side lobes, the amplitude and phase of the overall interference in the fade-out range can be calculated by summation of the individual interferences. If the fade-out range comprises several subcarriers, a processing unit 4 is provided for each frequency range occurring either completely or in parts within the fade-out range between two subcarriers, said processing unit being connected at its output with the input of an allocated compensation filter 6 via a unit for overscanning 5, said filter having a transmission function that equals or resembles the spectrum of the side lobes of the corresponding frequency intermediate range. Fig. 11 shows a block diagram for only one frequency intermediate range.

The output of the compensation filter s(k) 6 is connected to a first input of a subtraction member 3 and the output of the IDFT-unit 1 is connected to a second input of the subtraction member 3 so that an interference compensated transmitter signal may be detected at the output of the

subtraction member 3.

If the filter 6 is excited by a pulse having the amplitude and phase of the overall interference computed in the processing unit 4, a compensation signal is obtained in the fade-out range, the spectrum of which is very similar to the spectrum of the interference.

The output of the IDFT-unit 1 calculates the inverse discrete Fourier transform of the adjacent data vector x(n) and a parallel-to-serial converting unit 2 converts the parallel data stream emerging the IDFT-unit 1 into a serial flow of symbols. The entire signal in this frequency range is merely composed of crosstalk portions because the subcarriers adjacent the fade-out range have been charged with zero in the data vector x(n). The output signal of the filter 6 has inside the fade-out range a spectrum which resembles the spectrum of the crosstalk signal. By subtracting these two signals, the transmitter spectrum in the fade-out range is strongly reduced, e.g. by more than 20 dB.

If the fade-out range is not located exactly between two adjacent subcarriers, but rather extends over several subchannels or if the spectrum of power density is to be suppressed in several separate bands, the branch with the processing unit 4and the filter 6 must be performed additionally for each frequency range between two subcarriers. The filters s(k) 6 of each of the discrete branches must then copy the interference spectrum in each intermediate range. The variant illustrated in Fig. 12 uses the subcarriers contained in the fade-out range to carry out the compensation of the interfering side lobes. The transmitting functions of the filters $s_i(k)$ form a vector space. In order to be capable of recovering the data in the receiver through the application of a Discrete Fourier Transform, it is necessary to select the transmitting functions of the filters $s_i(k)$ to be orthogonal to the transmitting functions of the sounds used with the Inverse Fourier Transform unit. In this case, the set of the transmitting functions of the unused IFFT-channels can be used as a base for the vector space formed by the $s_i(k)$. When these functions are used as a base it is possible to have the filterings drawn into the Inverse Fourier Transform by means of the $s_i(k)$. In this case, the subchannels which overlap the fade-out ranges are not charged with zero but with values computed in the processing unit 4' so that IDFT and filtering yield the same results. The processing unit 4' calculates the new values with which the subchannels overlapping